

We Claim:

1. In a reactor having a gas inlet for feeding at least one reactant gas, a gas outlet for exhausting the at least one reactant gas, a longitudinal axis defined between the gas inlet and the gas outlet, a reactant gas flow direction defined parallel to the longitudinal axis, and a plurality of reactor zones defined along the longitudinal axis, and being used for a process involving one of deposition and oxidation of a plurality of semiconductor wafers being held perpendicularly to the reactant gas flow direction, a heating system adapted to change a temperature within the reactor during the process, comprising:

a plurality of heating elements corresponding to the plurality of reactor zones, each of said plurality of heating elements corresponding to a given one of the plurality of reactor zones being adapted to perform a temperature behavior according to a temperature profile versus time, a heating element corresponding to a zone nearest the gas inlet being adapted to perform a temperature behavior according to a temperature profile rising during the process, and a heating element corresponding to a zone nearest the gas outlet being adapted to perform a temperature behavior according to a temperature profile falling during the process.

2. The heating system according to claim 1, wherein at least two of said plurality of heating elements corresponding to zones closest to the gas outlet are adapted to perform temperature behavior according to respective temperature profiles, a given one of said at least two of said plurality of heating elements closer to the heating gas outlet having a greater difference than a given one of said at least two of said plurality of heating elements closer to the gas inlet.

3. The heating system according to claim 1, wherein said temperature profiles of neighboring zones of the plurality of heating zones do not cross each other during the process.

4. The heating system according to claim 3, wherein said plurality of heating elements are adapted to provide an identical end temperature of the process in each of the plurality of heating zones.

5. The heating system according to claim 2, wherein:

said plurality of heating elements includes at least four heating elements each corresponding to a respective reactor zone;

a first of said heating elements is disposed nearest the gas inlet and performs a temperature behavior according to the temperature profile that rises during the process;

a second of said heating elements is disposed between said first heating element and the gas outlet and performs a temperature behavior according to a temperature profile that is maintained constant during the process;

a third of said heating elements is disposed between said second heating element and the gas outlet; and

a fourth of said heating elements is disposed between said third heating element and the gas outlet;

said third and fourth heating elements each performing a temperature behavior according to a temperature profile that falls during the deposition or oxidation process.

6. A method for heating a reactor during a process involving one of deposition and oxidation of a plurality of semiconductor wafers, which comprises:

providing a reactor having a gas inlet for feeding at least one reactant gas, a gas outlet for exhausting the at least one reactant gas, a longitudinal axis between the gas inlet and

the gas outlet, and a plurality of reactor zones along the longitudinal axis;

holding a plurality of wafers perpendicularly to a reactant gas flow direction aligned parallel to the longitudinal axis to enable the process;

heating each of the reactor zones according to different temperature profiles versus time during the process;

increasing a temperature of a given one of the reactor zones nearest the gas inlet during the process; and

decreasing the temperature of a given one of the reactor zones nearest the gas outlet during the process.

7. The method according to claim 6, which further comprises decreasing a temperature of at least two of the reactor zones nearest the gas outlet to make a difference between a process start temperature and a process end temperature greater in a given one of the reactor zones nearer the gas outlet than in a given one of the reactor zones nearer the gas inlet.

8. The method according to claim 6, which further comprises defining the temperature profiles of neighboring zones not to cross each other during the process.

9. The method according to claim 8, which further comprises ending the temperature profiles of the process of the heating zones at a single identical temperature.

10. The method according to claim 6, which further comprises:

providing a heating system for heating the reactor;

dividing the heating system into at least four heating elements, each corresponding to a respective one of the reactor zones;

disposing a first of the heating elements nearest the gas inlet;

disposing a second of the heating elements between the first heating element and the gas outlet;

disposing a third of the heating elements between the first heating element and the gas outlet;

disposing a fourth of the heating elements between the third heating element the gas outlet;

performing a temperature behavior with the first heating element according to a temperature profile that rises during the process;

performing a temperature behavior with the second heating element according to a temperature profile that is maintained constant during the process; and

performing a temperature behavior with each of the third and the fourth heating elements according to a temperature profile that falls during the process.

11. A reactor, comprising:

a gas inlet for feeding at least one reactant gas;

a gas outlet for exhausting the at least one reactant gas;

a longitudinal axis being defined between said gas inlet and said gas outlet;

a reactant gas flow direction being defined parallel to said longitudinal axis;

a plurality of reactor zones disposed along said longitudinal axis, and being used for a process involving one of deposition and oxidation of a plurality of semiconductor wafers being held perpendicularly to said reactant gas flow direction;

a heating system adapted to change a temperature within during the process, including:

a plurality of heating elements corresponding to said plurality of reactor zones, each of said plurality of heating elements corresponding to a given one of said plurality of reactor zones being adapted to perform a temperature behavior according to a temperature profile versus time, a heating element corresponding to a zone nearest said gas inlet being adapted to perform a temperature behavior according to a temperature profile rising during said process, and a heating element corresponding to a zone nearest said gas outlet being adapted to perform a temperature behavior according to a temperature profile falling during said process.